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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,699	07/31/2001	Donald J. Milligan	10006051-1	5384

7590 04/01/2003

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER

NGUYEN, LAM S

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 04/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

09/919,699

MILLIGAN ET AL

Examiner

Art Unit

LAM S NGUYEN

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03/11/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: The "SUMMARY OF THE INVENTION" section is missing. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murthy et al. (US 5658471) in view of Mantell et al. (US 5867192).

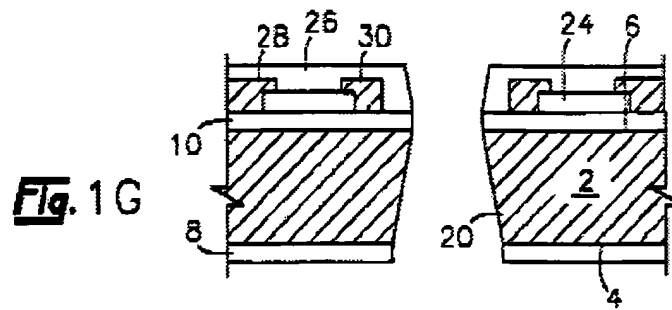
Murthy et al. disclose a fluid ejecting device comprising:

a silicon substrate having <100> crystalline orientation (FIG. 1G, element 2, and column 1, line 44-45),

a plurality of fluid/ink drop generators (FIG. 1G) formed on a first surface of said silicon substrate,

a fluid/ink feed slot extending from a second surface of said silicon substrate to said first surface (FIG. 1G, element 20) having an opening at the first surface having a width W1 (FIG. 4B, element 48) that is less than a width W2 (FIG. 4B, element 46) of an opening at the second surface.

Referring to claims 16, 19: wherein W1 is about 100 micrometers or less (column 8, line 45-50).



Referring to claims 17, 20: wherein W2 is about 300 micrometers or less

(column 8, line 45-50).

Murthy et al. do not disclose that said fluid slot formed by deep reactive ion etching followed by anisotropic wet etching.

However, Mantel et al. disclose a process of making cavities in a silicon substrate having <100> crystalline orientation wherein the cavities are formed by deep reactive ion etching process followed by anisotropic wet etching process (column 3, line 43 to column 4, line 23).

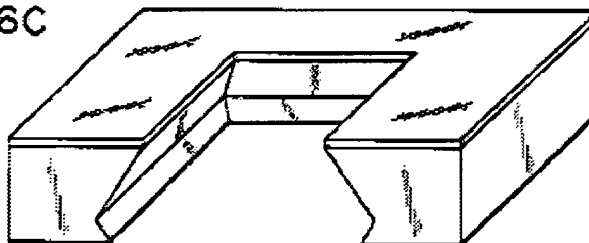
Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to form the ink feed slots in the printhead disclosed by Murthy et al. by the process of the deep reactive ion etching followed by anisotropic wet etching as disclosed Mantell et al. The motivation of doing so is that the advantage of the reactive ion etching is easily reproducible and the wet etching process is self-terminating, this is convenient for mass production as taught by Mantell et al. (column 3, line 46-48 and column 4, line 5-10).

2. Claims 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murthy et al. (US 5658471) in view of Mantell et al. (US 5867192) and further in view of Yagi et al. (US 6143190).

Murthy et al. and Mantell et al. disclose the claimed invention as discussed above, except wherein the fluid feed slot has a diamond shape (**referring to claims 21, 24**), the fluid feed slot has a width at a location intermediate the first surface and the second surface which is larger than width W1 (**referring to claims 22, 25, 27**), and wherein a longitudinal extent of the fluid feed slot is aligned with a $\langle 100 \rangle$ plane of the substrate (**Referring to claims 23 and 26**).

Yagi et al. disclose a fluid feed shot (in term of "a through-hole serving as an ink supplying hole" (column 27, line 4-6) in a $\langle 100 \rangle$ silicon wafer (column 12, line 33-34) has a diamond shape (FIG. 6C) with a width at a location intermediate the first surface and the second surface which is larger than width W1 (FIG. 6C), and wherein a longitudinal extent of the fluid feed slot is aligned with a $\langle 100 \rangle$ plane of the substrate (FIG. 6C).

FIG. 6C



Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to shape the ink feed slots in the printhead disclosed by Murthy et al. in view of Mantell et al. as a diamond having a width at a location intermediate the first surface and the second surface larger than width W1 as disclosed by Yagi et al. The motivation of doing so is to gain the controlling of the fluid conductance

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to a desired value, which could not be achieved by the conventional technique, as taught by Yagi et al. (column 12, line 20-28).

Response to Arguments

Applicant's arguments with respect to claims 21-27 have been considered but are moot in view of the new ground(s) of rejection.

Regarding to the argument on page 4 referring to claims 15, 18, 27: The applicants argued that since the cited references do not disclose, teach, or suggest to create ink slots of Murthy with the shape of the ejector channels of Mantell, there is no motivation for combining the Murthy and Mantell references. However, as disclosed by Mantell, the process of deep reactive ion etching followed by anisotropic wet etching is used to create diamond cavities in a Si substrate (column 4, line 1-3). In addition, as mentioned by the applicants (on page 2) that the possible sources for a motivation to combine references is the nature of the problem to be solved or the knowledge of persons of ordinary skill in the art. Therefore, it is persuasive that a person of ordinary skill in the art might uses the process creating the diamond cavities disclosed by Mantell to diagonally shape the ink feed slots disclosed by Murthy with the motivation is discussed above. Thus, these claims are unpatentable.

Regarding to the argument on page 5 referring to claims 21-27: The applicant argued that the Mantell et al. and Murthy et al. references fail to disclose wherein the ink feed slots having a diamond shape. However, as discussed above, the combination of Mantell et al., Murthy et al., and Yagi et al. disclose this limitation. Therefore, these claims are alos unpatentable.

Conclusion

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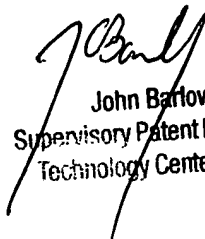
Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (703)305-3342. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BARLOW can be reached on (703)308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3431 for regular communications and (703)305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

LN

March 27, 2003


John Barlow
Supervisory Patent Examiner
Technology Center 2800